

EXPERIMENTAL MUSICAL INSTRUMENTS

FOR THE DESIGN, CONSTRUCTION AND ENJOYMENT OF NEW SOUND SOURCES

FROM THE PAGES OF EMI, VOLUME II
EMI's 2nd Cassette Tape

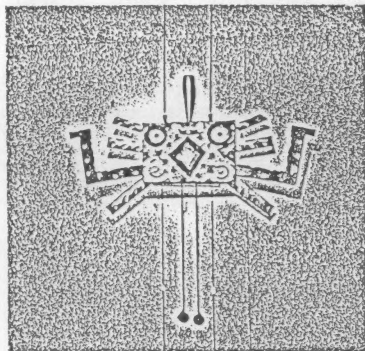
EMI is proud to announce that our new cassette tape is complete and available. It contains music of instruments which appeared in EMI during our second year of publication. The work of seventeen diverse and imaginative builders is represented in the compilation:

Ernie Althoff plays random music machines;
Minnie Black & friends play gourd instruments;
Warren Burt plays justly-tuned tuning forks;
David Courtney demonstrates homemade signal processing systems;
Ivor Darreg plays instruments of the Megalyra family;
Darrell DeVore plays the mallet kalimba;
Matthew Finstrom plays his new world mvet;
Denny Genovese plays fipple pipes;
Robin Goodfellow plays homemade instruments for children of all ages;
Vera Meyer plays the glass harmonica;
The Nihilist Spasm Band plays loud electro-acoustics, electronics and kazoos;
Nazim Ozel plays the Semi-Civilized Tree;
Tony Pizzo plays musical bow and tamboura;
John Sandin plays leather strap guitar and altered music boxes;
Stephen Smith plays glass & conduit marimbas;
Siemen Terpstra plays Polychord I;
and Richard Waters plays Waterphones.

As with EMI's first tape, the seventeen contributors to Volume II have provided us with a set of wonderfully unpredictable performances. The results are fascinating as documentation of the instruments, and satisfying from a purely musical point of view as well.

Those who purchased Volume I will remember the tiny enclosed booklet with information on the instruments. Volume II includes the same. The new tape goes a step or two beyond its predecessor though, in that it is longer (C-60 as opposed to C-45) and is recorded on higher quality tape

(continued on page 3)



ABOVE: SOUND SCULPTURE BY LEO TADAGAWA FROM THE SOUND GARDEN EXHIBIT IN TOKYO. THE ARTICLE STARTS ON PAGE 4.

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LETTERS

IN YOUR APRIL '87 EDITORIAL you were asking about an electric continuous strip "keyboard"...

Back in the 20s Maurice Martenot invented his namesake Ondes Martenot. Not only did this electric instrument have a traditional keyboard controller but it also boasted a ribbon device for tonal sweeps and an outboard, twelve-stringed sympathetic resonance chamber. The strings, whose sounds were picked up via transducers, gave the instrument its characteristic lingering sustain.

More recently, about ten years ago (maybe less), Electro-Harmonix made a MiniSynthesizer (not to be confused with their MicroSynthe) that had a monophonic membrane type 12ET keyboard and also a ribbon that permitted glissandi and the sounding of microtones. And there is a device that is presently available; the Gnome Micro-Synthesizer from PAIA Electronics in Oklahoma City. Their \$70.00 kit features a built-in ribbon controller and (according to their catalog) it can be modified to interface with guitars, electronic pianos, and polytonic keyboards.

And, I just tried using an E-bow on my monochord ...it works well. With enough effects this setup could out-wield any ol' keyboard!

So long for now,

Bob Phillips

READERS OF EMI MAY BE INTERESTED in knowing of the availability of two books. Susan Caust Farrell's Dictionary of Contemporary American Musical Instrument Makers is available from Columbia University Press (136 South Broadway, Irvington, NY 10533; price \$14.95 + \$3.00 handling, code # YM

3221), and Paul Berliner's Soul of Mbira is available from Daedalus Books (2260 25th Place NE, Washington DC 20018; price \$1.98 + \$3.00 handling, code # 6211). Both of these books are excellent reference sources and both will probably disappear "forever" after these closeouts. I'd encourage anyone to send for both catalogs, particularly the Daedalus which always has interesting high quality reminders and comes up with a few nuggets in the music department each year.

Tony Pizzo

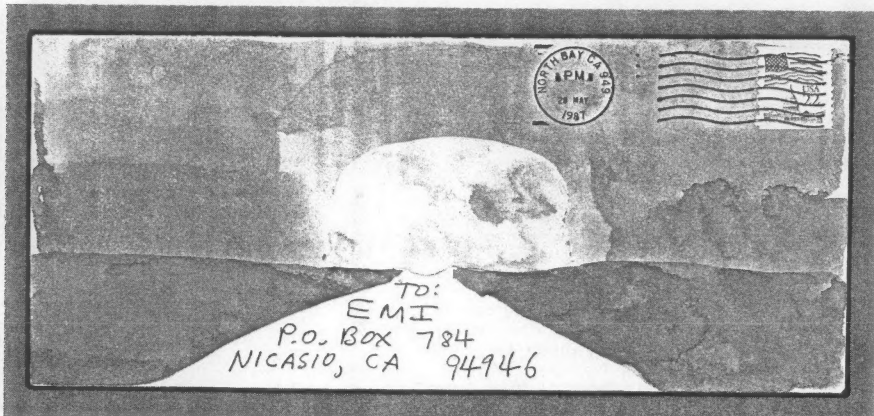
JUST A NOTE TO SAY "Keep up the good work!" I have enjoyed your publication unreservedly. It has also proved to be a valuable source of leads for information I need for the book on the marimba that I'm doing.

Despite all the current swing toward other tunings, etc., when you're dealing with an instrument having nearly 150 bars, you have to stick with 12ET just from a cost standpoint.

Analysis shows that of all possible keyboard designs, the 6-6 is the most efficient, producing the greatest playing density. The piano keyboard has almost exactly 88 inches of square area the pianist has to cover. It also has 88 pitches, so its "playing density" = 1.0. By contrast, the Musser 4.33 octave Model 250 has a density of 10.3! So it's more than ten times as spread out for the number of pitches it contains.

My design, the "Omnirimba" (because it does everything a marimba ought to do) has a playing density of 0.56, almost half that of the piano, though of course its physical area is much larger.

I think I've also made a breakthrough in the resonator department, a way to considerably reduce the size of those in the bass, so that the incorporation of bass pitches becomes truly practical in an instrument of wide resources but still



modest dimensions. I'm starting to run tests of the theory now, with my fingers crossed!

As an example of how far afield I've gone, how about an instrument whose bars are all suspended on films of air for maximum freedom of vibration. Not practical perhaps, but I'm ending some technical chapters with the outrageous so the ideas I'd like to have adopted look less so.

I can't at this point say too much about the actual design, but it will be practical to play "Flight of the Bumblebee" with four mallets in parallel thirds or fifths just as fast as it is now played with two on a conventional instrument. There are some very special mallet designs involved too. They are patentable, but that's too much trouble. So everything in the book that is of my own invention will go into the public domain for use by anyone who chooses to manufacture. Perhaps before I get too old, some enterprising builder will use some of these ideas to construct the instrument I have always dreamed of owning. I don't think I can afford to have one custom made.

Congratulations on your success thus far, and I hope it continues and grows. It's a great publication!

Yours for music,

Blake Mitchell

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SUBMISSIONS: We welcome submissions of
articles relating to new instruments.
Articles about one's own work are espe-
cially appropriate. A query letter or
phone call is suggested before sending
articles. Include a return envelope with
submissions.

THE NEW EMI TAPE, continued from page 1

(newly-recorded editions of Volume I will also use the superior tape).

Both tapes are available to EMI subscribers for \$6 apiece, and to non-subscribers for \$8.50. Checks should be made out to Experimental Musical Instruments, PO Box 784, Nicasio, CA 94946. For convenience, readers may use the order form envelope bound into this issue.

NOTICES

THE SILVER ANNIVERSARY OHIO GOURD SHOW will feature a special display of gourd musical instruments. The Gourd Show takes place at Morrow County Fairgrounds, Mt. Gilead, Ohio, October 3rd and 4th 1987. For more information contact the American Gourd Society, PO Box 274, Mt. Gilead, OH 43338. The society is also interested in hearing from people with instruments to exhibit or willing to demonstrate the making and playing of gourd instruments.

GLASS MUSIC INTERNATIONAL, INC. is a society devoted to the promotion of glass music throughout the world. Membership is open to players and builders of glass instruments, as well as glass music enthusiasts. GMI produces a newsletter, provides promotional services, and maintains a glass music library. Memberships start at \$15/year. For more information write GMI, 2503 Logan Dr., Loveland, CO 80538.

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CALL FOR PAPERS: The editors of the journal Leonardo announce a forthcoming regular section to be called SOUND, MUSIC, SCIENCE AND TECHNOLOGY. It will focus on broad issues involved in sound and art. Please direct inquiries, proposals and manuscript submittals to Larry Polansky, c/o Leonardo, 2020 Milvia St., Berkeley, CA 94704, USA.

PASIC 87, the Percussive Arts Society's annual convention, will take place in St. Louis from Oct. 29 to Nov. 1. Among events of special interest to EMI's readers are lectures on "New Instrumental Resources" by Ron George and "Musical Instruments and Sound Sculpture" by Ward Hartenstein. Pre-registration deadline in October 3. For more information contact the Percussive Arts Society, 214 W. Main St., Urbana, IL 61801.

The next presentation in the ongoing THE NEW INSTRUMENTS / NEW MUSIC concert series takes place on Sunday September 6th at 2:00 at 3016 25th St., San Francisco, CA 94110. The concerts feature performances on new and unusual instruments; for information on who and what will be featured this time, call (415) 282-1562.

INSTRUMENTS

THE SOUND GARDEN EXHIBIT IN TOKYO

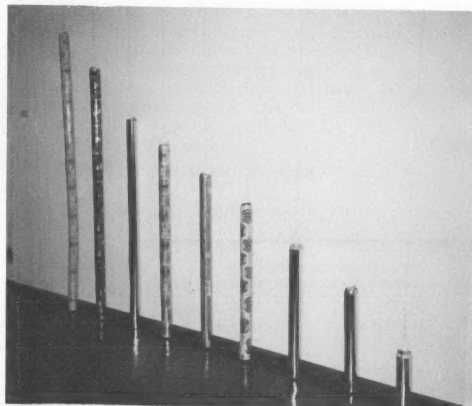
By Leo Tadagawa

From olden times, Japanese people have enjoyed the sounds of sound devices which make sounds by natural power, such as Suikinkutsu (an unglazed pot under the ground in which water drips), Shishiodoshi (a device made of bamboo which makes sounds by water power) in the traditional Japanese garden, or Huurin (a glass or iron windbell), etc. But these things are dying by modernization. Recently, people have gradually begun to reconsider what sound and music are, and to be interested in sound sculpture, sound objects, old and new sound devices, and sound installations.

The Sound Garden exhibit took place in Striped House Museum of Art, Roppongi, Tokyo, Japan, June 17-30, 1987. Participants were fourteen, and their works were about twenty. I would like to report on this exhibit.

Hiroshi Yoshimura, who directed this exhibit, is known as an environmental music composer. His "KA-ZA-NA-RI" (Wind Whistling) is a sound device made of empty beer cans. It sounds by two metals scratching together as the fan whirls in the wind. "KA-BE-NA-RI" (Wall Stamping) is a set of stamping tubes in different sizes, hung on the wall. His "MI-ZU-NA-RI" (Water Rippling) is two basins, each with a speaker underneath. They make various ripple marks in response to a drone sound recorded on the cassette tape.

⇒



KA-BE-NA-RI

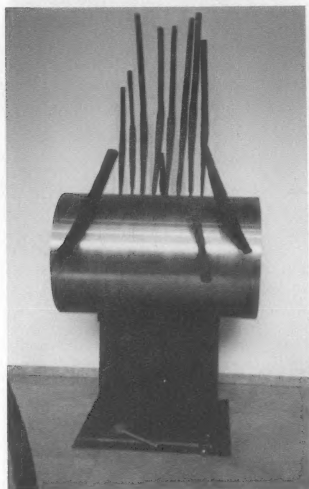
Tokuro Osaka is known as a light artist. His "PROTOSCAPE....Water" (not pictured) is a garden inside the museum with a kind of Suikinkutsu and some neon tubes. The audience waters the Suikinkutsu with a ladle, and the neon lights up in response to the sound.



Kenichi Kanazawa, a formative artist, made "Fragments of Sound," a set of unique metalophones. Round and square iron plates are cut into fragments to be played by bolts, pingpong balls, superballs and many kinds of mallets.

⇐

WAY is a group of formative artists which consists of five members (all appearing on this page): Yasushi Amako, Nobuaki Ito, Takayuki Kakizaki, Yasuaki Kobatake and Rintaro Watanabe. This time rather than as a group activity, they are participating as individual artists.



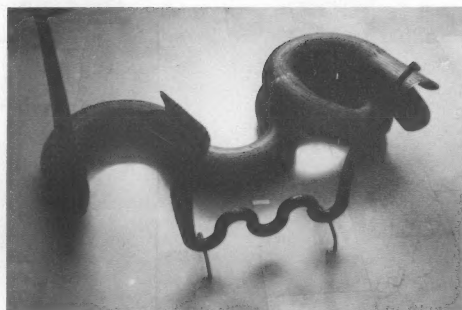
Yasuaki Kobatake's "Ferrous Structure of Sound" is
 ⇐ an object with ten or so steel bars. The audience
 hits them with wood or metal hammers.

Nobuaki Ito, also a rock guitarist, made "Rock."
 Six strings extended to the bronze object make
 electrically amplified sound when plucked by the
 audience. ⇒



Yasushi Amako's "A
 Giddy March" starts
 when the audience
 stands in front of it.
 Three pyramid-shaped
 dolls dance on the
 board.

⇐

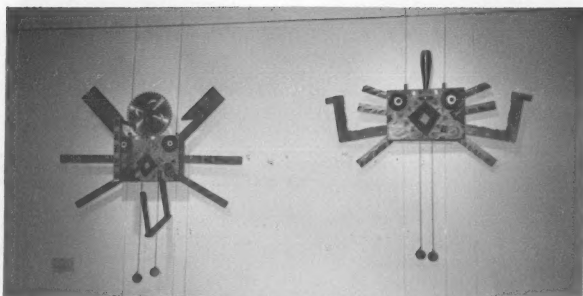


↑ Takayuki Kakizaki's "Drochi" is made of two ser-
 pent-like trumpets. One is big and swelling, and
 the other is very large and coiling.



Rintaro Watanabe's "R-I-N-G" (not pictured) is an
 automatic sound object, started by the soft touch
 of a baton to the score. Seven poles and a
 stringed object play a "tune" when the disc with
 patterns on it turns.

Leo Tadagawa, who is interested in musical instruments all over the world, made "Tinkololin on the Head" and "Crabs." The former are helmets or hairbands with propellers and aluminum tubes. Members of the audience wear them and walk, enjoying the tinkololin sound of the tubes hit by the small balls on the pivot of the propellers. The latter is a set of three crab-like objects on the wall. They make sound by hitting their heads with their arms when pulled by strings by the audience. ⇒



CRABS



THE ROTATOR AND SAILS PORTION OF "SOUND COLLAGES"

Yoji Matsumura's "Sound Collage" is a set of two sound installations. One is pinball-machine-like, and the audience drops metal balls from the floor above. The other is a rotator with two sails which moves by the wind from an electric fan. Under each sail hangs a metal ball, and the balls hit many kinds of objects such as glasses, bowls, bells, etc., arranged in their path. ⇐



Yoshio Ujiie and Yukari Tsuboya have made many sound installations. Their "No. 8 (Temporary Title)" (not pictured) is an upright piano laid down on the floor. In the resonating box there is a garden planted with various mosses and vegetation, arranged stones, etc. Near the piano, there is a sounding geiger counter set on a small lump of uranium.

↳ Hiroataka Watanabe is a lute maker/player. His "Spiralyre" is a kind of harp with a wooden spiral body. He says that this might be a descendent of bamboo harps like the valiha of Madagascar or many instruments of Southeast Asia.



Four years ago, a series of exhibits with "sound" as the theme began taking place every year in Striped House Museum of Art, under the direction of Hiroshi Yoshimura. Sound Garden was the title given to this year's exhibit. The audience has been increasing every year, and on two days of performance, people crowded throughout the museum (for the space is not so commodious). I hope that the movement in this area spreads throughout the world.

A catalog for Sound Garden, including video (only for data; the quality of the picture is not so high; VHS only) or cassette or both, are available.

Catalog + Cassette	1800Yen
Catalog + Video	3400Yen
Catalog + Cassette + Video	4000Yen

Only by postal money order please. Prices include postage.

Write to Leo Tadagawa, 1-12-24, Midorigaoka, Ageo, Saitama 362, Japan.



MODULAR INSTRUMENT SYSTEMS

by Bob Phillips

In this article, composer and builder Bob Phillips puts forth the concept of modularity in musical instrument design. The idea concerns a special approach to the pattern of pitch placement on the physical instrument.

For most familiar instruments, a standard format exists for the selection and sequencing of pitches as they are available to the player. For example, the assignment of pitches to keys on a keyboard, or the tuning and layout of a set of marimba bars, are normally done in accordance with a familiar traditional arrangement. Whatever the arrangement may be for any particular instrument, it is usually built into the instrument at the time of its construction.

With modular design, by contrast, the layout of the pitches is not permanently fixed. The approach instead is to construct an instrument in such a way that sounding pitches can be selected and assigned to physical locations on the instrument in whatever manner suits a particular need at a particular time, and altered when those needs change.

A goodly number of diverse instrument types are amenable to this sort of treatment. And as Bob Phillips shows in the following article, the approach has some interesting musical implications and a lot of practical advantages as well.

Technically, Modular Instruments Systems would probably best be defined as:

"...musical instruments which have been designed and built to provide the ability to directly alter the locations of the sounding bodies or their controllers, to facilitate the "mapping on" of any scalar or harmonic pattern ..."

In theory, such instruments would be flexible, open-ended and readily expandable.

In fact, many types of existing instruments lend themselves to modification or to being re-designed to qualify as modular instruments. Some examples:

Idiophonic Instruments.

Idiophones, such as percussion bar instruments, tend to be the easiest to adapt. Frames and stands can be "generically" designed to accept the varying lengths of sounding bars. It is simple then to design resonator tubes that will slip in and out of their positions.

> I've built modular sets of marimbas that feature "bars" made of wood, glass, large aluminum slabs, and metal conduit.¹

> Other materials such as bamboo, steel rebar,

and glass or steel rod² would be equally fair game.

> I'm also working on a set of PVC "tongue drums"³ in which the tubes are interchangeable on the frame.

> Recently in the pages of EMI, there was an article about a set of justly-tuned tuning forks.⁴ The article described the frame that is sometimes used to hold twenty of the forks (they are more often played hand-held). The frame allows the forks and their corresponding resonators to "be easily changed allowing various scales ... to be used at various times."

> Some readers may be familiar with the various instruments that were developed by Carl Orff for use with school children.⁵ Orff began realizing his version of integrated instrument systems as early as 1924.

Of course, not all idiophones are meant to be struck.

> I designed the Rotobo to be an automated rotary "nail violin."⁶ It has multiple preset discs, each with its own set of nails set to a particular pattern of pitches, to allow for modular restructuring.

> Another type of "bowed" idiophone is the Skritch.⁷ It consists of set of steel rods that are set into vibration with the assistance of the rosin-coated gloves worn by the performer(s). The set of rods is mounted simply on a frame; each rod is held in position by means of a knobbed bolt sort of set screw. In this way, the vibrating length of each rod can be quickly altered.

Membranophones.

Modular drums can be made by designing frames to hold a number of cylindrical drums of the same diameter, varied in length for different pitches.

> Good plans for this type of drum can be found in the Sound Designs book by Banek & Scoville.⁸ The stand/frame that I designed is hexagonal and holds nineteen 3" diameter drums.

Chordophonic Instruments.

Plucked, strummed or bowed; a variety of stringed instruments without frets can be easily adapted to function modularly. Normally, all that is necessary is the construction of interchangeable charts designed to mount under the strings. These charts of course indicate the various positions to stop the vibrating portions of the strings to achieve the desired intervals. Numerous charts can be made to highlight different

scales, modes, etc.

- > Instruments that immediately come to mind are the Megalyras⁹, and also Polychord I.¹⁰
- > Harry Partch used color-coded markings on fretless guitars, and used methods to identify specific intervals on cellos and on his elongated Adapted Viola.¹¹
- > Fretless electric basses also can be used with interchangeable charts.
- > For more precise intonation, instruments can be (indeed have been) designed with movable frets or "fretlets."
- > And there is a system of interchangeable fingerboards with various fret patterns called Novatone. The Novatone system can be retrofitted onto guitars, banjos and dulcimers.

Aerophones.

- > I've built a set of modular panpipes ($\frac{1}{2}$ " PVC conduit). Each tube is about 9" long. The tubes are tuned by means of corks inserted to varying depths. The tubes, of course, are interchangeable in a frame made of dowel rods and rubber bands (it's a prototype).
- > Also in the Sound Designs book, a type of "percussive" aerophone with modular potential is the Po Pipes (aka palm pipes, tamper, etc.). It is basically a set of PVC tubes (2" diameter, up to 14' in length) that are played by tamping with the palms on one of the open ends (tip from Down Under: try using beach thongs!). The instrument can be constructed so that portions of the tubes can be easily rearranged.
- > And something fairly strange: marimba resonators, played like a giant syringe using a vacuum cleaner's crevice attachment hooked up to the sweeper's exhaust port. (This particular arrangement is also helpful when tuning resonators.)

Electrophones.

- > Lastly, the Xenharmonikon, a "generalized" keyboard I have designed, with forty-four white keys only. The pitches, from tunable oscillators, can be patched to any key of the manual, in a way that is reminiscent of an old telephone operators' switchboard. The keyboard is not computer controlled in any way, but I'm sure it would be possible (and probably easier) to do this digitally.

Why MODULAR Instruments?

I began developing the idea of modular instruments to address four distinct yet related problems inherent in certain musical instruments, namely: human capability, accuracy, flexibility, and cost.

I will attempt to explain how the concept of

modular design can help in each of these areas, as well as how it can open up options not possible with traditional instrument design.

Capability:

Considering the fact that the human body has finite limits of motor control -- the arms can only stretch so far, the hands are cable of only a certain amount of dexterity -- few would disagree that it is a fair challenge to design playable instruments capable of a wide range of microtonal intervals. It is true that several talented individuals have, indeed, succeeded in building such instruments, but often these instruments require a great deal of dedication by the performer to be played competently. Modular instruments, by design, make far fewer physical demands of the performer.

Accuracy:

To be sure, all instruments require dedicated time to be played well. But while many players are attracted to the idea of concentrating solely on a single instrument type, other musicians (myself included) tend to work multi-instrumentally, often considering the recording studio and the various signal processing devices as vital elements (instruments) in their compositions.

Many instruments, both traditional and experimental in nature, make all the pitches of the "chromatic" scale present and accessible. But...

"... a scale is a source of materials, from which chords and melodies are drawn, and in which the scale as a scale appears only occasionally if at all."¹³

These words were written by Harry Partch and they underscore the fact that all the tones of a given scale are rarely used in the same composition, or section of a composition; often only a small fraction of the available pitches is required. If this is true, why build instruments which must accommodate all of these (temporarily) unneeded tones?

Modular instruments offer the ability to (pre-) select the desired tones and to eliminate unnecessary tones so that the performer does not have to consciously avoid playing them. This has the effect of reducing the need for virtuosity, thereby making the act of making music available to more people.

Flexibility:

By being able to select individual pitches on modular instruments, the performer or composer can create a custom palette of tonal colors. Not only are the pitches themselves variable, but also the location of the pitches: traditional constraints of low-pitches-to-the-left, high-pitches-to-the-right can be ignored.

To use the example of a modular marimba, appropriate tones (bars; sounding bodies) can be located next to each other so that specific chords can be arpeggiated by "sweeping" with the mallet(s) (reminiscent of Partch's Diamond Marimba

and Quadrangularis Reversum.¹⁴⁾ Similarly, quirky patterns that would be difficult to execute on a traditionally laid-out instrument can be arranged into a comfortably-played sequence.

Cost:

Supporting structures (stands; frames) that are designed to accommodate only a portion of the total number of sounding bodies at any given time can be made smaller, lighter, and to require less building materials. All of this helps reduce the cost of constructing, transporting and storing the instruments.

To further stretch the tight budgets that are not uncommon among renegade instrument builders, most modular instruments lend themselves to being built piecemeal, adding elements as finances allow.

Reality

The purpose of this discussion of modular instruments is to stimulate further applications of these principles through experimentation. Individual musicians can determine to what extent modular instrument systems will work for their own specific needs:

- > Certain composers might require a relatively large framework (or perhaps multiple frames) holding several groups of sounding bodies, in order to provide for intervalic comparisons and/or to permit modulation.
- > Whereas the multi-tracking home-recorderist may only need a small setup, because alterations can be made between takes. The money saved on instruments could be applied to the purchase of more recording tape, or head cleaner and Q-tips!
- > Or another musician might be found utilizing a single stand with numerous "preset" arrays so that modules can be interchanged between songs or sets.

Future Possibilities

As work continues on designing or adapting instruments with modular capabilities, I would like to encourage anyone who has (or will) come up with modular designs to share them with EMI. Or, if you'd like to contact me directly, please write:

Bob Phillips
c/o research & musical development
1315 Dodge Ave.
Ft. Wayne, IN 46805
(219) 482-1213.

1. A fine book that covers many kinds of instruments, including various types of marimbas, is *Sound Designs* by Reinhold Banek and Jon Scoville (Berkeley: Ten Speed Press, 1980).

Related EMI articles:

- Stephen Smith's *Conduit Marimbas* and *Glass Marimbas* (Vol. II #1), featuring Erv Wilson's adaptation of the Bosanquet keyboard layout.
Daniel Schmidt's *Resonated Bar Gongs* (Vol. II #2).

2. Glen Prior's 31-tone *Bamboo Marimba* (Connoisseur, August 1983)
Bart Hopkin's *Rebar Scraper Chimes*

Related EMI articles:

- The *Glass Orchestra* (Vol. II #2)
Robert Rutman's *Bow Chimes* (Vol. I #1)
3. Harry Partch's *Boo I & II*, described in his book, *Genesis of a Music* (New York: Da Capo Press, 1979).
Banek and Scoville's *Bosabalos* in *Sound Designs* (inspired by Partch's *Boos*).
4. Warren Burt's tuning forks (EMI Vol. II #5).
5. Carl Orff, see entry in *The New Grove Dictionary of Musical Instruments* (New York: Grove's Dictionaries of Music, Inc., 1984) for more information and a short bibliography.
6. Bob Phillips' *Rotobo* (write for details).
In EMI:
Bart Hopkin's *Nail Violin* (in *Slit Drum* article, Vol. II #4).
Mike Meadow's *Nail Violin* (in the *Letters* column, Vol. II #5).
Tom Nunn's *Mothers & Crustaceans* (Vol. II #3 & 4. Richard Waters' *Waterphones* (Vol. II #3).
6. Mickey Hart, Jim Loveless, Danny Orlando and Willy John Cashman's *Sketch* in the *Making Music* catalog (see EMI Vol. III #1).

See also:

- Deagan Catalogs, reprinted in *Percussive Notes Research Edition* Vol. 24 #3/6, March/ Sept. 1986 (Aluminum Harps appearing on p.156 forward).
8. Kydex Drums, in *Sound Designs*.
9. Ivor Darreg's *Megalyra Family* (EMI Vol. II #2).
10. Siemen Terpatra's *Polychord I* (EMI Vol. II, #2).
See also:
Pierre-Jean Croset's *Lyra* (EMI Vol. I #1).
Cris Forster's refined version of Partch's *Harmonic Canon* in the *Making Music* catalog (cited above).
11. Partch, *Genesis of a Music* (cited above). See also: descriptions of various Kitharas in the same work.
12. Tom Stone's *Novatone*. For more information write to:
Mark Rankin
6540 Dana St.
Oakland, CA 94609.
13. Po Pipes, in Banek & Scoville's *Sound Designs* (cited above).
11. Partch, *Genesis of a Music*, page 121.
12. Partch, *Genesis of a Music*.

IRREGULAR OVERTONE SPECTRA LINKED TO ANTISOCIAL BEHAVIOR IN COURT TRIAL

Lawyers representing a man charged with several misdemeanors suggested in a lower court trial this week that he had been driven to aberrant behavior by prolonged exposure to musical instruments with irregular overtone series. The defendant is known to have performed publicly on the wazoo, the angora diabolica and the reverse-parabolic crumhorn, all of which produce partials which, according to expert testimony, are "profoundly disturbing." The man is accused of tying parked cars together by the bumpers with dental floss, apparently intending to study the acoustic results when they drove away.

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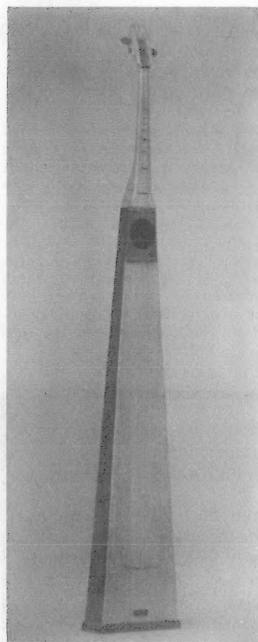
THE TRUMPET MARINE

by Michael Meadows

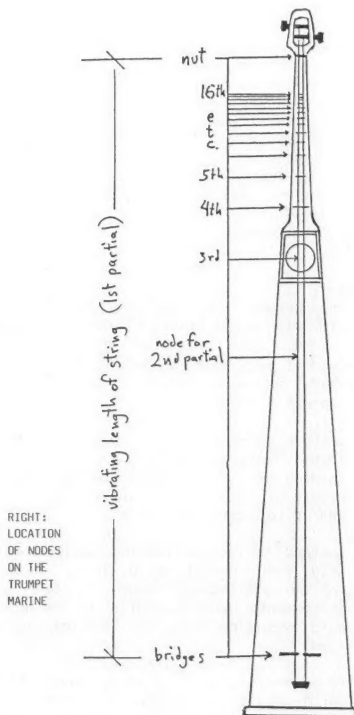
It is not a trumpet; it has nothing to do with the sea or the military, and it is perhaps one of the strangest instruments to come out of the Renaissance period.

The trumpet marine (also known as *tromba marina*, *trumscheit*, and *nun's fiddle*) is a bowed monochord on which only harmonics are played. Usually five to six feet long, it is capable, thanks to an unusual type of bridge, of sounding remarkably like a trumpet or distant horn. This article will briefly discuss its history, playing techniques, construction, and other properties which I've discovered in my own version of the instrument.

Evolving from a simple drone instrument, the trumpet marine began to develop its own identity around 1450 with the addition of a peculiar vibra-



LEFT:
MICHAEL MEADOWS'
TRUMPET MARINE



ting bridge which gave it a distinct brassy quality. Almost a century later, the development of the technique of playing harmonics combined with this effect to produce a very trumpet-like sound. (In all fairness, though, detractors likened it to a "triton's conch, capable of frightening asses.")

Despite its relative obscurity today, the trumpet marine was widely accepted in Europe until its popularity began to wane in the 1700s. Even then, there were concerts featuring trumpet marines in duets, quartets and ensemble pieces with other instruments.

The body of the instrument is an open-ended resonator which flares slightly toward the open end. The neck, attached to the smaller end, terminates in a pegbox containing the tuning mechanism. (One such device was a ratchet-and-pawl arrangement -- the precursor of the modern

machine head.) The instrument has one -- sometimes two -- playing strings on which only harmonics are played. Rarely, sympathetic strings were strung inside the resonator to enrich the sound.

Although there are meter-long, elongated pyramidal versions of the instrument frequently depicted in paintings and lithographs of the time, there are apparently no surviving examples of these. However, there are dozens of the longer instruments (up to two meters) with five- and seven-sided backs closeted away in various museums. Most of these were found in convents. (It seems the nuns were not allowed to use the natural trumpet, and the trumpet marine, being capable of the same pitches and similar timbre, provided a satisfactory alternative. Hence: nun's fiddle.)

My own instrument has a five-sided back of clear pine, a spruce soundboard, and a neck of rock maple. The tuning pegs are rosewood, as are the markings on the neck for the harmonic nodes. The sound-hole rosette at the top of the soundboard is mounted on a sliding panel, behind which are the tuning pins for the sympathetic strings.



ABOVE: THE SLIDING PANEL AND SYMPATHETIC STRINGS

These sympathetic strings extend from the inside base of the soundboard to the base of the neck which projects about seven inches into the resonator. The front of this projection is recessed to allow room for the tuning pins.

For me, the most interesting aspect of this instrument is its vibrating bridge. Made of maple, this simple device carries the string over one foot, leaving the other foot (called the long foot because of the greater distance through it from string to board) free to vibrate against the soundboard. The bridge can be adjusted later-



ally to bring out the desired tone quality. Shifting it in the direction of the vibrating foot will produce a harsh, percussive snarl as a result of decreased pressure from the string on that foot. Moving the bridge in the opposite direction increases pressure, inhibiting the vibration. In this extreme, the longer foot will cease to vibrate freely and the sound produced will be soft and of a rather poor quality.

Located between these extremes, however, is a position that yields surprising results. With the draw of a bow, a sound curiously like that of a muted trumpet blares forth from this unlikely beast. In order to keep the bridge in its desired position, a bit of powdered rosin can be rubbed onto the bottom of the bridge's short foot.

In playing position, the trumpet marine rests on the floor with the neck leaning on the musician's left shoulder (for right-handers). The string being played is touched lightly at a particular node with the side of the thumb or index finger, while the right hand draws the bow across the string at a point halfway between the node being touched and the upper nut.

My own instrument is six and a half feet tall with two playing strings, each having a speaking length of sixty-four inches. Having two strings allows for more rapid articulation of pitches as well as the options of drone accompaniment, double stops, and playing in different tunings. For instance, tuning the fundamental pitches to a 6/5 interval yields a bluesy major-minor scale.

On this large-sized trumpet marine, musicians traditionally played only the 4th through 12th partials, although in rare instances they did reach as high as the 16th. Even the "out of tune" partials, the 11th, 13th, and 14th, were apparently occasionally allowed as passing tones, but that old bugbear, the 7th, was strictly off limits. Yet much higher partials are available -- even up to the 64th where the potential nodes (on my instrument) are only 1/64th of an inch apart. This proximity, of course, makes accurate pitch determination a bit iffy above the 16th partial.

Nevertheless, there is a way.

If you have a trumpet marine handy, touch the string at the mark for the 4th partial. But instead of bowing at the halfway point between the upper nut and the touchpoint, bow $\frac{1}{4}$ of the distance from the upper nut. Because the mark for the 1st node of the 4th partial also corresponds to the 2nd node for the 8th partial, the antinode formed by the bowing here will urge the string to vibrate not in four but eight parts, sounding the

8th partial. Likewise, touching the string halfway between the 4th and 5th partials will give rise to the 9th, the second node of which is located at $\frac{1}{2} \times 9$, or 4.5.

An interesting result of this "alternate fingering" technique is the ability to play bona fide "in tune" major scale (as if we needed another instrument for that purpose). Using the aforementioned method, finger the partials 8, 9, 10, 10.5, 12, 13.5, 15 and 16. The resulting major scale gives reason to wonder if the "out of tune" partials supposedly occasionally used in the past were, in fact, in tune as a result of using this technique.



ALTERNATIVE FINGERING BETWEEN THE MARKED NODES

As a drone instrument, the trumpet marine offers a wide range of timbres. By altering the bridge placement as previously discussed, and by varying the bowing technique, one can augment certain harmonics while suppressing others, giving rise to anything from a rich bass growl to a soprano shriek. I use a double bass bow; it's great for droning and sustain (even with the very high harmonics) but not the best for articulation, I suspect. Something like a cello bow would probably be better. Traditional bows for trumpet marine are shorter still (12" - 16" long).

A word about strings: The playing strings are .022 overwound to .048. An unwound string seems to have too high a stiffness factor which causes the higher partials to be sharp. I have yet to try a wound nylon or gut string due to being unable to locate a supplier of either of these in seven foot lengths. (Leads, anyone?)

The sympathetic strings, all tuned one or two octaves above the playing strings, range from .008 to .016. The use of various diameters provides a broader range of response than does a set of identical strings.

The trumpet marine is one of several instru-

ments I've built that has only a fundamental pitch and/or the harmonics of that pitch as its sound resources. Among these other instruments are various notched and fipple pipes, reed pipes and didgeridoos.

For anyone interested in making a trumpet marine, I can recommend the source for my basic design, *Ancient European Musical Instruments* by Nicholas Bessaraboff (Cambridge, MA: Harvard University Press, 1941).

Further information on author Michael Meadows's doings may be found in the letters section of EMI Vol. III #1. Or contact:

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Urbana, IL 61801
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RECENT ARTICLES, continued from page 20

MUSICWORKS 37 (1087 Queen St. West, Toronto, Canada, M6J 1H3) is a special issue titled "mechanical disturbances, especially in the air." It focuses, once again, on instrumental explorations:

THE LONG STRING INSTRUMENT is an interview by Gordan Monahan with Ellen Fullman. Fullman's remarkable longitudinally-vibrating instrument (featured in EMI Vol. I #2) is the focus of the discussion.

ORIGINAL MUSICAL INSTRUMENTS FOR REAL TIME COMPOSITION by Tom Nunn (a frequent contributor to EMI) is an exploration of the construction and philosophy behind the space plates and electro-acoustic percussion boards designed by Nunn.

MAKING A CREE DRUM with ALBERT DAVIS, by Tina Pearson, provides complete instructions for traditional native American drum construction, from "finding the tree" to "making rawhide," as well as exploring the instrument's social context.

TWENTY-FOUR STRINGS, by Gayle Young, describes the Amaranth, an instrument designed and built by the author for intonational exploration as well as performance. The Amaranth is a zither with movable bridges, sounded by bowing, plucking or striking the strings with hammers. Included are some interesting comments on the psychological interpretation of unfamiliar pitch relationships.

A NOTE ON SOUND SCULPTURE, by Charles de Mes-tral, looks at some difficulties with the term "sound sculpture" and the implied thinking behind it, and, having thus set the stage, moves on to a discussion of the author's work in sound source design with the performing group Soudé. Three original sounding devices are described, one using rigid or flexible sheets of various materials as initial sound sources, another using water running in pipes, and a third using various shapes of metal. Two installations are also described, which combine visual sculpture with recorded sound distributed specially by an array of speakers.

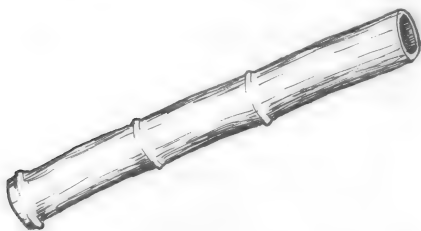
Every now and then EMI shifts its attention away from newly invented instruments to look at traditional instruments which might be of interest to explorers in acoustic design. This short article reviews some of the possibilities inherent in one of simplest of traditional instruments, stamping tubes.

'AU NI MAKO

Article by Bart Hopkin

The term "stamping tube" is used to describe a hollow tube, usually of wood or bamboo, which produces sound when it is struck against another surface (usually the ground). This definition is broad and rather ambiguous on some points, but sounding devices meeting the general description, with varying degrees of formal elaboration, appear in diverse cultures from many parts of the world. In particular they are found in Asia and the Pacific, South America and the Caribbean, and parts of Africa.

A basic form of the instrument might be a single joint of bamboo, closed by a node at one end. The tube can be sounded by holding the tube upright and tamping the closed end against a firm surface with a vertical motion. This produces some idiohonic sound in the wood, and it also



excites the enclosed air column. The air vibration is usually strong enough to produce an identifiable pitch, corresponding to the length of the tube. The result (though it may vary from one form of stamping tube to another) should be an agreeable blend of percussion and pitch.

In some cases the wood may also be tuned to produce the same or a related pitch. This can be done by slitting longitudinally from the open end along part of the tube's length, creating two parallel opposing halves which can be tuned like the tines of a tuning fork. Other possible elaborations of the basic form include making the slits narrow enough to allow the two halves to buzz together, or adding tone holes in the sides of the tube which can be opened and closed to change the resonating frequency of the enclosed air. Other means of sounding the instruments also are employed: they may be struck on the ground with more of a swinging motion, or two of them may be struck

together, or they may be tamped on the open end with the palm of the hand. Stamping tubes from different cultures also vary greatly in size. Between all of these variables and many more, the devices from around the world that fall within this classification are a varied lot.

We will not set out to describe the specific forms in more detail here. Instead, we'll look at another aspect of their development, namely, the personal/social axis of their use.

Stamping tubes, in their most basic form, are simple instruments -- simple to make and simple to play. Given that, one might choose to use them to play simple music, such as rhythmic accompaniments of one or two notes. That has often been done. Or one might choose to create more elaborate versions of the instruments to make them more versatile. That, as we noted above, has also often been done. Or one might choose to keep the basic instrument simple, but multiply the number of tubes used together as a way of broadening the musical possibilities.

This latter idea appeals to me, for the reason that it de-emphasizes complex equipment and emphasizes instead human musical involvement, either individual or cooperative. Rather than creating increasingly elaborate machinery, it keeps the machinery simple and develops the human resources.

Let's go to the Caribbean for two examples of the cooperative use of multiple stamping tubes:

In Haiti there are hocketing ensembles of tuned stamping tubes, called *ganbo*. The tubes are made of large diameter bamboo. A photo from *The Drum and the Hoe* by Harold Courlander shows a four man *ganbo* ensemble. Three of the players play one large tube each, the longest being about three feet long. The fourth player holds two tubes of less than a foot, one in each hand. The photo catches each of them in different phases of the motions of tamping their tubes on the ground, apparently working in polyrhythmic cooperation.

Now we turn to Trinidad. Stamping tubes came into prominence there in the bamboo *tambo* music that developed earlier in this century. This was the music of the stick bands that appeared after the British outlawed drums among the black population late in the 19th century. These bands were huge -- incorporating tens or even hundreds of players -- and at Carnival time they poured into the streets, creating a wonderful noise. The sticks they used were bamboo tubes, large in diameter, and four to six feet long. The people played them by pounding them on the ground. Varying lengths were used, and sectional polyrhythmic music was rehearsed and performed with wonderful effect. As with the drums before, such an outpouring of vitality among the population at large did not sit well with the ruling class. The police pointed to fights allegedly breaking out between rival bands, and a general undercurrent of

fear among the upper classes led to the banning of bamboo tamboo in 1937. Many will have guessed by now where all this is leading: Deprived first of the drums and then of the stamping tubes, the Trinidadian populace turned to the junk yards; the following year the Carnival music was primarily metallic, and in a matter of a few more years the great tradition of the Trinidadian steel bands had evolved. But what a fine example of communal music making, using a minimum of resources and elaborate equipment, were the stick bands while they lasted!

So much for ensemble playing -- let us consider now the personal approach. Can many stamping tubes be played by a single individual? It is fairly common to have two stamping tubes played together, one in each hand, by one person. One would think it might be difficult to go much beyond that (few of us, after all, have more than two hands), but there are possibilities.

'Au ni mako is a stamping tube set found among the 'Are'are people of the island of Malaita, Solomon Islands, and some neighboring peoples. The 'Are'are have a wonderful music culture. They are most noted for elaborate, contrapuntal panpipe hocketing. Their stamping tube set normally consists (believe it or not) of ten tubes, all managed by a single musician. He plays sitting on the ground, legs spread in front. Four tubes are held in each hand. These he strikes end-on against a large roundish stone resting on the ground in front of him, between his legs. The remaining two tubes he wedges between the toes of each foot. By the motion of his feet he strikes these against one or the other of two smaller stones which rest near each foot. The tubes range in size from 13 to 46 centimeters long, and are deliberately to a pentatonic scale. The dry, percussive sound of the ten bamboo tubes played together is reminiscent of a xylophone.

Thus can one person take the simplest of instruments and play rhythmically complex pentatonic music over a range of almost two octaves.

I myself come from a culture whose great achievements include some extraordinarily elaborate mechanical and electrical music making devices, from the great church organs of the past to the computer music systems of the present. From that vantage point I find it valuable to pay my respect to musical sophistication of a different sort, found in the musician playing the Malaitian stamping tube set 'au ni mako.

Most of the information on 'au ni mako included in this article is taken from the entry on 'au ni mako by Mervin McLean in The New Grove Dictionary of Musical Instruments (London: MacMillan Press, Ltd., 1984; Stanley Sadie, Ed.). The information on the Trinidadian stick bands is from personal knowledge and from Pete Seeger's *Steel Drums: How to Play Them and Make Them* (New York: Oak Publications, 1964).

Experimental Musical Instruments regularly reports on organizations and periodicals of potential interest to its readers. In this issue we look at the leading scholarly organization in the field of ethnomusicology.

THE SOCIETY FOR ETHNOMUSICOLOGY

Reviewed by Bart Hopkin

An awareness of goings on in the field of ethnomusicology is valuable to creative instrument builders for a couple of reasons. One is that organology (the study of musical instruments) is often regarded as a field within the field of ethnomusicology, and research into interesting traditional instruments often turns up in the ethnomusicological literature. The other reason is that creativity never exists in a vacuum. For instrument designers, as with all musicians, it is valuable to have a sense of what sorts of musical sounds are possible and humanly meaningful. That sense grows with a knowledge of the diverse musical languages of the world.

The most prominent organization in the field of ethnomusicology is the society discussed here. Inside the front cover of its journal, the Society for Ethnomusicology describes its purposes as follows:

The object of the Society for Ethnomusicology shall be the advancement of research and study in the field of ethnomusicology... Its aims include serving the membership and society at large, through the dissemination of knowledge concerning the music of the world's peoples.

The society meets these aims primarily through its publications. These include the journal *Ethnomusicology*, the *SEM Newsletter*, and occasional special publications. The most prominent of these, of course, is the journal, which appears three times annually and is typically close to 200 pages long. There are usually five or six extended articles, plus a liberal complement of film, record and book reviews.

As you would expect, most of the material is not specifically devoted to instruments. Musical instrument articles do occasionally appear, though, such as the recent "The Harp in India Today," by Roderic Knight (*Ethnomusicology*, Vol. 29 #1, Winter 1985), which discusses a variety of unusual harps and includes several good photographs.

The articles not primarily concerned with instruments are a widely varied lot. Topics range from the most obscure tribal musics in their purest forms to the syncretic traditions and popular music styles that have become increasingly predominant in recent decades. Some examples from recent issues: "Fitness and Flexibility: Funeral Wakes in St. Lucia, West Indies;" "Stability and Variation in a Hopi Lullaby;" "On the Problem of Inferential Ambience in Musical Meter;" and this

one, which caught my eye because I was given the task of transcribing some auctioneer calls myself once: "Are You All Unhappy at a Twenty Dollar Bill?": Text, Tune and Content at Antique Auctions."

The record and book reviews appearing in *Ethnomusicology* are especially valuable. It would be difficult to keep up with the growing documentation of the world's musics without help in becoming aware of what is appearing. Ethnographic recordings appear on labels from countries all across the globe, and most of these will not be found on the shelf at Tower Records. About ten to fifteen record reviews, a similar number of book reviews and two or three film reviews appear in each issue of *Ethnomusicology*, and they really help put a handle on things.

A rather curious example of the sort of review one might find here and nowhere else: One recent review described two recordings purporting to present prehistoric music, and another presenting near-prehistoric music. The two prehistoric recordings are done using original instruments recovered from archeological digs. Amazing! One of them includes lurs (horns from Bronze Age Scandinavia) alongside a variety of shells, rattles, bone scrapers and the like. The other is a concert for a set of mammoth bones which archaeologist Sergei N. Bibikov has concluded (despite some skepticism from others) functioned long ago as a percussion instrument. In both cases the music represents someone's purely speculative interpretation of prehistoric music. We, of course, have no means of knowing whether these interpretations come anywhere near the mark. The reviewer, Bo Lawergren, writes with an appropriately skeptical attitude, but he resists the easy temptation to be a killjoy and trash the whole idea.

As a bastard child of musicology and anthropology, the field of ethnomusicology has seemed at times in the past to suffer from a sort of academic inferiority complex. As a result, ethnomusicologists have sometimes sought respectability in an exaggerated concern with scientific quantification of the subject matter, and with cultural authenticity in the choice of music deemed worth considering. But the study of ethnomusicology seems to attract a vital, thoughtful, innovative, and humane sort of person. This can be seen by a look at some of the field's guiding lights -- Charles Seeger, Mantle Hood, Colin McPhee, Alan Merriam and many others. Narrow attitudes do not flourish under such leadership. Their spirit comes through often enough in the pages of *Ethnomusicology* to prevent the journal's becoming a scholarly exercise divorced from the vitality of the subject matter.

Still, it is difficult to present living human musical expression in a format of formal scholarly discussion without sacrificing something. Readers may at times be disappointed to see how dry a culture's music can become in the black and white of these pages.

I myself once submitted an article for publication to *Ethnomusicology*. It was an interesting experience; a learning experience. The topic was Jamaican children's songs, based on collecting I had done in the island in 1979. A very long time after I initially sent it in, the article came back to me with the editor's comments. In the interim it had been sent to several "referees," who, I ascertained from context, were not the same sort as are found at football games. The consensus seemed to be that the article was worth printing on the basis of the importance of the subject matter, but that it had a long way to go before it measured up to the required standards of scholarship. Prominent among the suggestions for improving it was that I provide more statistical data, giving, for instance, the percentage of songs in my sample that used a particular scale, or the frequency with which a certain pitch occurred in an individual song. I did my best to take these suggestions as I prepared a revised version. When it came to quantifying my data, I think I did rather poorly, but there can be no doubt that the other suggestions resulted in a more disciplined, better researched, and generally much improved article. It ultimately appeared in *Ethnomusicology* Vol. 28 #1, January 1984. The conclusion to be drawn from this story is that *Ethnomusicology* encourages a form of scholarship that may seem dry at times, but that is diligent, respectable and valuable.

Membership in the Society for Ethnomusicology is open to anyone with an interest in the subject. The cost is \$35/year, or \$20/year for students. Members receive the journal and the newsletter, and have the right to vote in elections. The address is

Society for Ethnomusicology, Inc.
PO Box 2984
Ann Arbor, MI 48106.

ETHNOMUSICOLOGY



RECORDINGS OF NEW INSTRUMENTS

Ernie Althoff, *The Way I see It* (Cassette on NMA Tapes, from NMA Publications, PO Box 185, Brunswick 3056 Vic, Australia). An acoustic random music machine set against a very odd text.

Francois and Bernard Baschet, *Structures for Sound* (LP produced by the Museum of Modern Art, New York; now out of print). Recordings of the Baschet brothers' unique and diverse instruments, produced in conjunction with an exhibit at MMA in the 1960s.

(For another recording of Baschet instruments, see the listing under Deneuve.)

Bay Area New Gamelan (cassette tape from the American Gamelan Institute, Box 9911, Oakland, CA 94613). Compositions for American gamelan played on instruments built by Daniel Schmidt.

The Blackearth Percussion Group (LP on Opus 1; NMDS). A classic record. Works by Lou Harrison, John Cage, Peter Garland and others for a variety of out-of-the-ordinary percussion.

Glenn Branca, *Symphony No. 3* (LP on Neutral; NMDS). Branca uses electric guitar-like instruments to explore an extended overtone series. Several of his works are recorded; this 3rd Symphony is listed here because in it the electric guitars have metamorphosed into specially designed electro-acoustic keyboards.

John Cage, *Sonatas and Interludes for Prepared Piano* (LP on CRI; NMDS). From Cage's great body of work, the prepared piano works are listed here because they have been so very important to the practice of instrumental exploration in this century.

John Cage, *Music for the Keyboard 1935-1948* (2 LPs on Columbia Masterworks). A classic: some prepared piano, some toy piano -- all great.

John Catler, J.C. and the Microtones (LP on M-Tone Records, M-Tone 100). A guitar re-fretted to 31-tone equal temperament, along with fretless bass and drums, in a hard-driving pop combo.

Wendy Chambers, *The Star Spangled Banner* (7" 45rpm record on Artmusic; NMDS). Several short pieces played on the car horn organ.

Emmet Chapman, *Parallel Galaxy* (LP on Back Yard Records, 8320 Yucca Trail, Los Angeles, CA 90046). The Chapman Stick appears on various records, but this is the recording planned by the inventor to show it off at its best.

A DISCOGRAPHY FOR EXPERIMENTAL INSTRUMENTS

Compiled by Bart Hopkin with assistance from Henry Rosenthal and Tony Pizzo

What follows here is an attempt to create a listing of commercially available recordings of new musical instruments.

Records and tapes are included here, organized alphabetically by the artist's or producing organization's name. In keeping with EMI's general focus, we have emphasized recordings of acoustic and electro-acoustic instruments which have come into being in recent years, and bypassed synthesizers and software-using machines.

Many artists and builders have cassettes available which are not distributed commercially in a formal way; these are not included here, because it would be impossible to capture and present a fair sample of all the activity in that ever-changing arena. However, EMI regularly provides information on such recordings in connection with specific articles.

For recordings which might otherwise be hard to find, an address for the distributor is given. The notation "NMDS" appears for those which are available through New Music Distribution Service, 500 Broadway, New York, NY, 10012. We recommend that people write for the NMDS catalog -- it is an invaluable source for all kinds of new music.

Putting together a discography on this subject is difficult. Relatively few recordings devoted to new instruments are produced commercially. Most of those are not handled by major labels -- the majority are independently produced and distributed through smaller, less-established distribution networks. This means that they can be hard to find. Even learning of their existence often is a matter of chance. Such recordings also tend to become unavailable (to "go out of print") quickly, since they are usually made in a single, fairly small pressing. Additionally, many recordings of experimental instruments lie buried and undiscovered in albums or collections not primarily devoted to them.

All of this is to say that this discography will be, inevitably, flawed and very incomplete. Readers who are aware of important recordings that we have missed can help us by writing to EMI and bringing them to our attention. We will add them to an updated list.

Barney Childs, *Clay Music* (10" record on Cold Blue; NMDS). Music composed by Barney Childs for Susan Rawcliffe's flutes, whistles, and ocarinas.

David Cope, *The Way* (LP on Opus 1; NMDS). Four movements from a larger work for solo performer using acoustic voice modification techniques, springs, chimes and various devices made specifically for the piece, along with pump organ, music box and more.

Pierre Jean Croset, *Harmoniques du Temps* (LP on Ocora, distributed by Harmonia Mundi). Croset plays his lyre, an 18-string zither played entirely in harmonics.

Andrew Culver, "Tensegrity Sound Source #5," on *Musicworks 33: Starting All Observations From Scratch* (Cassette tape issued in conjunction with issue #33 of *Musicworks*, 1087 Queen St. West, Toronto, Canada, M6J 1H3). Excerpts from a longer work for this many-stringed instrument employing Culver's tensegrity design principle.

Deadline, *Down by Law* (LP on Celluloid). A magnificent fusion of third world instruments (including didjeridu) and hip-hop synthesized music.

Constance Demby, *Sunborne* (cassette tape from Gandarva, PO Box 5044, Mill Valley, CA 94942). Demby has built instruments very similar to Robert Rutman's Steel Cello and Bow Chimes, and plays them and many other interesting instruments on this new age recording.

Stuart Dempster, *On the Boards* (cassette from Art in Form). Contemporary didjeridu -- warm and human drones.

Michel Deneuve, *Le Cristal* (cassette tape from A.T.E.C., 20 rue des Tournelles 75004 Paris). Deneuve plays his own compositions, as well as pieces by Bach and Satie, on the best-known of the Baschet instruments, the Cristal.

Arnold Dreyblatt, *The Orchestra of Excited Strings*, "Nodal Excitation" (LP on India Navigation; NMDS). Altered string basses played in harmonics by tapping with the bow, with the chosen harmonics reinforced by other instruments. Very repetitious and slow-evolving music.

William Eaton, *Music by William Eaton* (LP from En Esumus, PO Box 670, Tempe, AZ, 85281). Eaton makes plucked string instruments in curvaceous, fanciful forms.

Experimental Musical Instruments, *From the Pages of Experimental Musical Instruments, Volume I* (cassette from EMI, PO Box 784, Nicasio CA 94946). This cassette contains music of instruments featured in EMI during its first year of publication.

Experimental Musical Instruments, *From the Pages*

of *Experimental Musical Instruments, Volume II* (cassette from EMI, PO Box 784, Nicasio, CA 94946). All the diversity of EMI's second year of publication is covered in this newly-released tape.

Bruce Fier, *Score for a Rainbow's End* (33rpm 7" record from Fier Artworks, 7748 Tampa Ave., Reseda, CA 91335, possibly now out of print). Sounds from a sound sculpture of tuned metal rings.

Terry Fox, "Internal Sound," on *Revolutions Per Minute* (the Art Record) (double LP from Ronald Feldman Fine Arts, Inc.; NMDS). The amazing sound of two 100 meter piano wires stretched the length of an Italian Church.

Gordon Franklin, *Sounds in Clay* (cassette available from Gordon Franklin at 1445 Elmville Rd, Peebles, OH 45220). Traditional melodies and new compositions played on Sharon Rowell's multiple ocarinas.

Ellen Fullman, *The Long String Instrument* (LP on Apollo; NMDS). This is different from other long string installations in that the strings' vibrations are longitudinal rather than transverse, producing a completely different effect, as well as a convincing rationale for extreme lengths.

The Glass Orchestra (LP on Music Gallery Editions; NMDS). Improvised music played entirely on instruments made of glass.

The Glass Orchestra, *Tales from Siliconesia* (7" 33rpm record, from the Glass Orchestra, 23 Whitaker Cresc., Willowdale, Ontario, Canada, M2K 1K7). A light-hearted and off-hand production -- other recordings by the GO better represent the their work (such as more recent cassettes, informally produced, available from the same address).

Mel Graves, *Three Worlds* (LP on 1750 Arch; NMDS). Lots of interesting percussion, steel drums, and Waterphone.

Gravity Adjusters Expansion Band, *Hole in the Sky and One* (LPs on Nocturne, both now out of print). Both feature Waterphones and many other exotic instruments.

Marco Antonio Guimaraes, *UAKTI Oficiaria Instrumental*, *UAKTI II* and *Tudo e todas as coisas* (3 separate LPs on Ariola, distributed by Polygram). Guimaraes is a Brazilian instrument inventor, with a wide variety of both traditionally-based and entirely new instruments to his credit. He performs here with his group Uakti.

Lou Harrison, *Music of Lou Harrison* (LP on CRI; NMDS). In recent years Lou Harrison has written primarily for American Gamelan, using instruments built by Bill Colvig in performance. Many recordings are available, all containing wonderful

music; this one presents a good cross section.

Mickey Hart, *Dafos* (Available on CD only, on Reference). The adventurous percussionist for the Grateful Dead employs the Beam and a lot of traditional non-Western instruments in this recording.

Ralph David Hill, *The Sounds of Just Intonation* (2 cassettes and a book, available from the Just Intonation Network, 535 Stevenson St., San Francisco, CA 94103). This is a just intonation tutorial. The musical examples are performed on a computer. It is included here because of the importance of just intonation to new instrument builders whether electronic or acoustically oriented.

Robert Horton, *Plateau Artz Ensemble* (cassette available from 7 Coso Ave., San Francisco, CA 94110). Traditional & ethnic instruments along with some home made electronics in interesting ambient/percussive pieces, many in just intonation.

Mauricio Kagel, *Acustica* (double LP on Deutsche Grammophon). Features an amazing collection of homemade instruments.

Daniel Lentz, *Missa Umbrarium* (LP on New Albion; NMDS). Mass for voices and wine glasses, which, in Lentz' hands, produce an amazing timbral blend.

Richard Lerman, *Travelon Gamelan -- Music for Bicycles* (LP on Folkways; NMDS). Do you remember attaching playing cards to the frame of your bicycle so that they plucked the spokes of the spinning wheels?

Annea Lockwood, *Glass World of Annea Lockwood* (LP on Tangent Records, Suite 11, 52 Shaftesbury Ave, London W1; may be out of print). An inventive exploration of sound possibilities in glass. Also by Lockwood using glass sounds: *Tiger Balm* (one side of an LP on Opus 1; NMDS).

Alvin Lucier, *Music on a Long Thin Wire* (LP on Lovely Music; NMDS). Minimal sounds produced by "The Long Thin Wire Installation" in 1979.

Alvin Lucier, *Music for Solo Performer* (LP on Lovely Music, NMDS). Alvin Lucier and Pauline Oliveros use amplified brain waves (from their own brains) to electro-mechanically play selected ensembles of percussion instruments.

Making Music (cassette available in conjunction with the *Making Music* catalog, from the California Crafts Museum, Box 1119, Menlo Park, CA 94026). Samples of instruments which appeared in the recent *Making Music* exhibit, featuring over twenty builders and many more instruments. The tape carefully documents the sounds of the instruments in isolation rather than emphasizing complete compositions.

George Marsh, *Marshland* (LP on 1750 Arch; NMDS).

Lots of interesting percussion, plus Waterphones.

Marcia Mikulak, *"Improvisation #2"* on *Artspace* Winter 1985-86 (floppy 33rpm soundsheet accompanying this issue of *Artspace*, PO Box 4547, Albuquerque, NM 87196). Mikulak plays the *Harp Resonator*, a new string instrument of her own design.

David Moss, *Full House* (LP on Moers Music; NMDS). David Moss has recorded extensively; this, being his own date, probably best represents him and his equipment. Moss plays the sound sculptures of Harry Bertoia, things of water, wood, metal and plastic, plus drums and standard percussion; Christian Marclay plays scratchy turntables, John Zorn plays game calls and more; and it all comes out manic and funky.

Musicworks 30: Sound Constructions (Cassette produced in conjunction with *Musicworks* magazine, 1087 Queen St. West, 4th Floor, Toronto, Canada, M6J 1H3). This was a special issue of *Musicworks* devoted to unusual instruments -- includes material from Logos (interactive installations & more), Paul Panhuysen (long string installations), Lief Brush (nature sound monitoring systems) and some aolean harps.

Musicworks 37: Mechanical Disturbances, Especially in Air (production information the same as the preceding listing). Another issue of *Musicworks* with an emphasis on sound sources. This one features Tom Nunn (frequent contributor to EMI), Ellen Fullman and the Long String Instrument, gamelan, Cree Indian drum, a bowed zither by Gayle Young, a set of three large Byzantine Catholic Cathedral bells and recent work by Sonde using a variety of new sounding devices.

The Nihilist Spasm Band, Vol. 2 (LP on Music Gallery Editions; NMDS). Aberrant rock-band-like electro-acoustic instruments producing off-the-wall improvisatory noise music.

Other Music, Prime Numbers (LP on Other Music; NMDS). This record was produced during Other Music's gamelan period, when they were building their own justly tuned American gamelan instruments. The instruments are featured prominently in a musical style that is fresh, thought provoking, and unique to Other Music.

Other Music, Incidents Out of Context (LP on Other Music, NMDS). The gamelan-derived instruments are integrated here into a more diverse ensemble. The group's intriguing and idiosyncratic style continues to evolve in this more recent recording.

Paul Panhuysen, *Long String Installations* (Set of 3 LPs on Apollo; NMDS). Huge electro-acoustic string installations. Included is a beautifully-produced oversized book documenting the installations visually.

Harry Partch, *Delusion of the Fury* (Set of 3 LPs on Columbia [M2 30576]). In addition to Partch's

extended dramatic work, one side is devoted to his own description and demonstration of the instruments.

Harry Partch, **Music of Harry Partch** (LP on CRI [CRI 193]; NMDS). A collection of Partch's best known compositions and recordings: "Cloud Chamber Music," "The Letter," "Windsong," portions of "The Bewitched" and more.

Harry Partch, **Petals Fell on Petaluma** (LP on CRI [CRI 213]; NMDS). This work consists of many short sections for various instruments.

Harry Partch, **The Bewitched** (LP on CRI [CRI SD 304]; NMDS). This is the musical drama that incorporated so many of Partch's ideas about corporeality, movement and gesture, functional integration of visual effect with musical, as well as intonational purity.

Harry Partch, **The World of Harry Partch** (LP, Columbia Masterworks [MS 7207]). Includes Daphne of the Dunes, Barstow, Castor & Pollux.

Harry Partch and John Cage (LP on New World Records, 3 E. 54th St., New York, NY 10022). Includes more work by Partch plus Cage's Music of Changes.

Penguin Cafe Orchestra, **Music from the Penguin Cafe and Broadcasting Live from Home** (LPs on Editions EG). Valuable and enjoyable as a collection of concise musical anecdotes using some homemades, world instruments and lots of ukelele.

Cleve Pozar, **Solo Percussion** (LP on CSP records, NMDS). Intriguing and melodic live multitracking on marimba, drums and a variety of home-made instruments and effects.

Godfried-Willem Raes and Moniek Darge, **Improvisation-Composition** (LP on Igloo, Stichting Logos, Kongstraat 35, 900 Gent, Belgium). Improvisations on custom-built and modified instruments. Some interesting electronics as well.

Michel Redolfi, **Sonic Waters** (LP on Hat Art; NMDS). Music for synthesizer and flute, written to be played underwater on special sound systems designed for the purpose.

Randy Roos, **Mistral** (LP on Spoonfed Records, 21544 Rambla Vista, Malibu, CA 90265; may be out of print). Roos developed the Fretless Holland Sustain Guitar, a fretless guitar capable of infinite sustain by means of an electro-magnetic feedback system. In this recording he also uses conventional guitars and guitorgan backed by standard rock/adult-contemporary instrumentation.

Jon Rose, **The Relative Violin** (cassette from Fringe Benefit Records, 172 Riverview Ave., Danger Island NSW 2253, Australia). Sonic explorations on an altered and tortured violin.

Sharon Rowell -- see listing under Franklin.

Stephen Scott, **New Music for Bowed Piano** (LP on New Albion Records; NMDS). Music played with tiny bows directly on the strings of an open piano, or else using a special device for exciting the strings electromagnetically.

Sonde en Concert (LP on Music Gallery Editions; NMDS). Free music from various sound constructions -- sheet metal, clustered strings, flute-like things, voices & more. For more recent recordings by Sonde, see the listing under Musicworks 37.

Son of Lion, **Gamelan in the New World and Gamelan in the New World Vol. II** (LPs on Folkways; NMDS). Music of an American gamelan built and directed by Barbara Benary.

Sounds of Sound Sculpture (LP on ARC; now out of print). Sounds from structures built by various artists in the 1960s.

Tellus #14 (cassette available by subscription only from Harvestworks, 16 W. 22nd St. (902), New York, NY 10010). Tellus is an audio cassette magazine. #14 is devoted to just intonation, and includes works by various composers and performers for, among other things, American gamelan and Partch instruments.

U.S. Steel Cello Ensemble, **Bitter Suites** (LP on Rutdog Records, now out of print). Robert Rutman's steel cello and bow chimes in live performance.

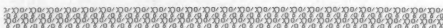
Peter Van Riper, **Whomp Whip Music** (cassette on VRBLU; NMDS). Music for tuned aluminum baseball bats.

David Van Tieghem, **These Things Happen, Safety in Numbers, & Private Music** (LPs on Warner Brothers). Electro-acoustic synthesized percussion and toys by an important innovator and session musician.

Yoshi Wada, **Lament for the Rise and Fall of the Elephantine Crocodile** (LP on India Navigation; NMDS). Very slowly evolving music for voice & the odd bagpipe-like instruments that Wada has made.

Yoshi Wada, **Off the Wall** (LP on Wada/SAJ; NMDS). Newly released, once again using Wada's strange bagpipes.

Waterglass (cassette on Touch; NMDS). Water sounds and electronics.



RECENT ARTICLES APPEARING IN OTHER PUBLICATIONS

Listed below are selected articles of potential interest to readers of *Experimental Musical Instruments* which have appeared recently in other publications. This issue's "Recent Articles" listing is considerably longer than usual. For who knows what reason, an unusually large amount of interesting material related to new instruments has appeared in various publications in the last couple of months.

THE HARRY PARTCH INSTRUMENT COLLECTION AND ENSEMBLE, by J.B. Smith, in *Percussive Notes* Vol. 25 #4, Spring 1987 (Box 697, 214 W Main St., Urbana, IL 61801-0697).

This is an interview with Daniee Mitchell, curator of the collection of Partch instruments at San Diego State University and director of the Harry Partch Ensemble. He discusses the present and future of the legacy of Harry Partch as regards instruments, performance of Partch's works, and the like.

PATRICK ZENTS, "CRANK," reviewed in the "Viewpoints" section of *High Performance* #37 (240 S. Broadway, 5th Floor, Los Angeles, CA 90012).

Patrick Zents is a Montana rancher and artist who makes installations in which conventional instruments are operated by mechanical or natural forces. The piece reviewed here involves a set of 6 drums sounded by the turning of a crankshaft on which sticks are mounted. Movement of the shaft is triggered photoelectrically by people passing.

SECOND SPECIES: EVOLUTIONARY OPERA, by Iris Brooks, in *Ear* Vol. 12 #2, April 1987 (325 Spring St., Rm. 208, New York, NY 10013).

This article is a look at the opera *Second Species*, conceived by and evolved under the direction of Keith King. The article emphasizes the process of creation of the opera as much as the end product. Of special interest for new instruments people will be the way the music and the instruments used function in the overall scheme. The instruments were created by Skip La Plante, of the group *Music for Homemade Instruments*. Included with the article are photos of the carimba, glass test tube panpipes, and other *Music for Homemade Instruments* designs.

Ear Volume 12 #4, June 1987 (address above) is so full of material relating to new sound sources you'd think that was the main thing happening in new music these days.

First, there are some "Meet the Composer" interviews. One is with GORDON MONAHAN, a composer who focuses on the physical nature of sound and the means by which it is created. He discusses several installations and performances past or planned, including pieces involving swinging speakers; wind, fire and water-activated environmental devices; and long string things.

The second interview is with MIECZYSLAW LITWINSKI. Among his musical forms are "Bios," which are musical meditations using stones and organic materials as sound sources.

The third is with NICOLAS FRIZE. His work with such sound sources as toys and industrial machin-

ery is described. He also uses stones in various ways, and has built a black marble lithophone.

In the "Eareviews" section of the magazine are reviews of two pieces dealing with new instruments: THE CAFFEINE EFFECT by Fast Forward, seen in performance at Roulette in New York City, features percussionist and instrument builder Wes Virginia. He uses a variety of clever junk instruments and provided "a virtuoso display of multiple hubcap spinning." IN WILDERNESS IS THE PRESERVATION OF THE WORLD, by the McLean Mix, seen in performance at the Alternative Museum in New York, works with nature themes. It employs a lot of nature sounds along with a tuned bicycle wheel, which McLean bows and strikes. Both reviews are accompanied by photographs.

Leonardo Volume 20 #2 (2020 Milvia St., Berkeley, CA 94704) is a special issue subtitled "Visual Art, Sound, Music and Technology." Several interesting articles appear:

SOUND SCULPTURE: SOUNDS, SHAPES, PUBLIC PARTICIPATION, EDUCATION, by Francois and Bernard Baschet, is an overview of the Baschet's work of the last twenty years, followed by a program for their future work. (This article picks up where another written for Leonardo in 1968 left off.) A number of the Baschet's soundworks are depicted, and there are several informative photographs, but the article focuses on the philosophy behind the works. This is a rare look into the thinking of two of the most important and innovative instrument designers of our century.

THE GLASS HARMONICA: A RETURN FROM OBSCURITY, by Gerhard Finkenbeiner with Vera Meyer, is based upon Vera Meyer's article which appeared in *EMI* Vol. II #4. It describes the instrument, provides some history, and discusses Finkenbeiner's techniques in building it.

THE RELOCATION OF AMBIENT SOUND: URBAN SOUND SCULPTURE, by Bill Fontana, describes the author's approach to sound sculpture. Fontana creates sculpted sound, rather than sounding sculptures. His work usually takes the form of live ambient sound picked up electronically in diverse locations and transmitted to other environs, where they are arranged spatially and allowed to interact.

Journal of the Catgut Acoustical Society Number 47, May 1987 (112 Essex Ave., Montclair, NJ 07042) contains several articles of note:

CONSTRUCTION AND PERFORMANCE OF QUALITY COMMERCIAL VIOLIN STRINGS, by Ian Firth, analyzes several brands of strings in terms of their construction, materials, and vibrating behavior based upon sonometer tests. The article is especially fascinating for its scanning electron microscope photographs, showing the strings, with their cores, intermediate layers and over-wrappings, magnified to a degree of extraordinary detail.

ON BORE SHAPE OF A SHAKUHACHI AND ITS RESONATING CHARACTERISTICS, by Yoshinori Ando, discusses the effect of the natural bore shape upon tone hole placement and the intervals between the lower and upper registers.

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